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**H01G 4/40; H05K 7/20872; H02M 3/003;**  
**H02M 7/003**

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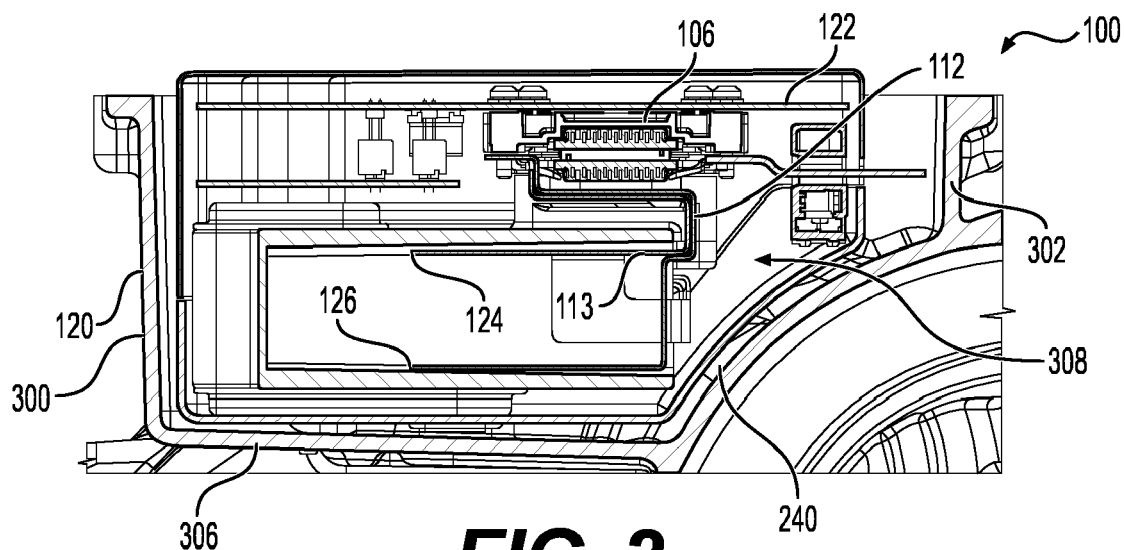
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(54) **SYSTEMS AND METHODS FOR COOLING ELECTRONIC COMPONENTS OF A VEHICLE**

(57) A method of cooling electrical components of a vehicle comprises directing coolant through a capacitor housing (102) into a power module (106) containing one

or more inverters. The capacitor housing (102) preferably encloses a capacitor (104), and the capacitor housing (102) is preferably formed substantially of plastic.



**FIG. 2**

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## EUROPEAN SEARCH REPORT

Application Number

EP 22 21 6225

## DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2019 116179 A1 (FORD GLOBAL TECH LLC [US]) 19 December 2019 (2019-12-19)	1-4	INV. H05K7/20
Y	* paragraph [0010] - paragraph [0070]; figures 1,2,11,12, 14-21 * -----	5-7	B60L50/50 H01G2/08 H01G4/40 H02M7/00
Y	EP 2 006 989 A2 (HITACHI LTD [JP]) 24 December 2008 (2008-12-24) * paragraph [0043] - paragraph [0043] * -----	5-7	
Y	EP 3 653 418 A1 (TOYOTA MOTOR CO LTD [JP]) 7 20 May 2020 (2020-05-20) * paragraph [0034] - paragraph [0066]; figures 3-12 * -----	7	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			H05K B60L H01G H02M

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Place of search

The Hague

Date of completion of the search

22 June 2023

Examiner

Seifert, Frank

## CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone  
 Y : particularly relevant if combined with another document of the same category  
 A : technological background  
 O : non-written disclosure  
 P : intermediate document

T : theory or principle underlying the invention  
 E : earlier patent document, but published on, or after the filing date  
 D : document cited in the application  
 L : document cited for other reasons

& : member of the same patent family, corresponding document



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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**see sheet B**

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

**1-7**

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).



**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**1. claims: 1-7**

**Method for enabling sequential cooling connection between  
the capacitor housing and the power module**

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**2. claims: 8-13**

**Method for avoiding any direct contact between the coolant  
from the coolant loop and any surface of the metal casting.**

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**3. claim: 14**

**Method for restricting number of openings in a metal casting  
being mounted to a frame of the vehicle, wherein the coolant  
extends through the metal casting at only two openings.**

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# **ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-06-2023

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